DRYDEN
POLICY
DIRECTIVE

Directive: DPD-8740.1A
Effective Date: July 13, 2000
Expiration Date: July 13, 2005

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RESPONSIBLE OFFICE: S / Range Safety Systems Office (RSSO)

SUBJECT: Range Safety Policy for Dryden Flight Research Center (DFRC)

1. PURPOSE

This policy provides project managers and anyone performing advocacy of new programs, the process to follow and requirements that must be addressed in the project design to allow safe and successful flight test operations at the Edwards Flight Test Range (EFTR), and other test ranges, under NASA sponsorship. This policy addresses overall program risk to the public, Range Safety and Flight Termination System (FTS) requirements, and Range Safety Operations. The goal of this policy is to ensure public safety. Additionally, this policy identifies to the projects, at the earliest stage of vehicle development, requirements for public risk assessment, range safety, and FTS processes and requirements.

2. POLICY

All NASA sponsored Uninhabited Aerial Vehicle (UAV) projects, including Autonimous and Remotely Piloted vehicles, whether air or ground launched, which are intended for flight operation on the EFTR or any other test range, shall be assessed by the RSSO to determine the risk they present to the public and property in their flight operations. Any such NASA project shall include range safety requirements as part of any advocacy, contract, or other agreement. When the assessed risk of the project's flight test operations to the public and property is greater than that allowed by Department of Defense, RSSO, and AFFTC Range Safety Office standards, the project (in concert with the RSSO) shall provide for risk mitigation in accordance with DFRC Range Safety and FTS requirements. The RSSO process shall involve the project from conception and follow the development of the vehicle including presentations during design reviews. Flight projects are required to provide all data and analysis required by range safety and flight termination standards.

DFRC is a tenant on a USAF installation. The RSSO is the DFRC contribution to the NASA/Air Force Alliance for Range Safety and FTS issues. As such the RSSO shall maintain a close relationship with the AFFTC Range Safety Office to ensure that uniform and consistent Range Safety and FTS requirements are levied on NASA sponsored projects. The RSSO shall formulate and coordinate DFRC Range Safety and FTS requirements consistent with Department of Defense standards and with the AFFTC Range Safety Office.

When flight test operation risk mitigation is required, the specific risk mitigation techniques and hardware systems proposed by the project shall be assessed by the RSSO for adequacy, effectivity, and compliance with Range Safety and Flight Termination System (FTS) requirements set by the DFRC RSSO. The RSSO shall also be responsible for ensuring that range safety related ground systems present a minimal risk to ground crews and flight operations.

The RSSO shall review each individual project's final Range Safety and FTS designs and flight operations plans with respect to established Range Safety and FTS requirements and report their findings and recommendations to the DFRC Airworthiness and Flight Safety Review Board (AFSRB) and/or the AFFTC Commander as required for project flight approval.

3. AUTHORITY

a. RCC Range Safety Working Group standard/127-1 for overall risk assessment and requirements.

b. RCC standard 319-XX and DCP-F-103 FTS Requirements Document

c. DoDD 3200.11 Major Range and Test Facility Base and AFFTC 11-1 Flying operations, Aircrew operations.

d. NASA Procedures and Guidelines (NPR) 8715.3 NASA Safety Manual

4. ADDITIONAL RANGE SAFETY POLICY DETAIL

To elaborate on range safety policy, the following additional policy information and guidance is provided:

The DFRC Range Safety Policy is to protect the uninvolved public and property and to the extent possible, any uninvolved aircraft*, from the hazards of Experimental and Test Vehicle Flight.

The DFRC Policy requires the definition of an acceptable risk to the uninvolved public and property standard.

The verbal standard shall be that experimental and test vehicle operation shall pose no more hazards to the uninvolved public and property than their exposure to risk resulting from commercial aviation vehicles.

The numerical standard shall be consistent with the current Range Commander's Council Standard 327-XX, "Common Risk Criteria for National Test Ranges." The current numerical standard is twofold, for a single test mission, an individual's risk per mission shall be less than one chance in a million (1×10^{-6}). Second, the collective risk of the population exposed to risk from the test mission shall be less than 30 chances in a million (30×10^{-6}).

The basic hazard for range safety risk assessments shall be an air vehicle failure. The RSSO and the test vehicle organization (project) shall collaborate on an assessment of the air vehicle's probability of failure to be used in range safety risk assessments.

Pre-mission hazard mitigation systems, including flight termination systems, and procedures shall be designed by the test vehicle organization and reviewed and approved by the RSSO.

Real time hazard mitigation actions shall be performed by a RSSO or AFFTC certified Range Safety Officer (RSO). The RSO shall execute this function by monitoring the test vehicle flight and terminating it when the test vehicle performance presents an unacceptable hazard to the uninvolved public and property, or violates preplanned termination criteria.

Launch of and continued flight of any vehicle under this policy shall be at the discretion the RSO.

To execute his real time hazard mitigation responsibility, the RSO shall be provided with knowledge of the test vehicle's current health, position, and performance. For vehicles operating under this policy, if the test vehicle position becomes unknown, it shall be considered a hazard to the uninvolved public and will be terminated at the first time the public would be at risk as identified during preflight planning or at the RSO's discretion.

* Protection of uninvolved aircraft is largely dependent of Air Traffic Control (ATC), but cooperative effort by the Dryden RSO is required to avoid violation of ATC assigned work areas, altitude blocks, etc. The UAV has no "eyes", and ATC is not always aware of any limitations in speed, maneuverability rate of climb/descent etc. Interactive communication between the RSO and ATC is essential.

The functional FTS standard shall be a termination action that will result in a test vehicle state of near zero lift and thrust culminating in the smallest most predictable impact footprint.

For high energy vehicles departing or entering the EFTR, primary Range Safety responsibility will reside with the AFFTC, with support from the DFRC RSSO.

5. REFERENCES

DCP-S-052 FTS Requirements Document

Kevin L. Petersen
Director

Document History Log

This page is for informational purposes and does not have to be retained with the document.

Status Change	Document Revision	Effective Date	Page	Description of Change
Baseline		7-13-02		
Admin. Change		11-18-04	All	• Added Document History Log. • Added "Compliance is mandatory." on first page. • Corrected typographical, grammatical, and some format errors.
Revision	A	12-14-04		Document moved to Code S.